REMARKS

This is a full and timely response to the non-final Official Action mailed **April 23, 2007**. Reconsideration of the application in light of the following remarks is respectfully requested.

Claim Status:

By the present amendment, claims 9, 22 and 55-62 have been cancelled without prejudice or disclaimer. New claim 63 is added. Consequently, claims 1-8, 10-21, 23-54 and 63 are currently pending for further action.

35 U.S.C. § 101:

Claims 50-54 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In this regard, the Office Action points out that current guidelines "require that for computer programs to be seen as statutory, they must be instructions, on a computer-readable medium, that are executable by a computer." (Action of 4/23/07, p. 4).

It is not immediately clear how originals claims 50-54 do not meet these guidelines. Claims 50-54, as originally presented, recited a processor readable medium with instructions thereon. It would seem elementary that, if the medium is "processor readable," the instructions are readable and, therefore, executable by a processor.

Nevertheless, to expedite the prosecution of this application, claims 50-54 have been amended herein to expressly recite that the instructions on the processor readable medium and "executable by a processor." This amendment merely renders explicit that which was already perfectly clear from the original claim language to those skilled in the art. Therefore, the

amendments made in this regard do not, and are not intended to, narrow or change the scope of any of claims 50-54.

Following entry of this amendment, the rejection of claims 50-54 under § 101 should be reconsidered and promptly withdrawn.

35 U.S.C. § 112, First Paragraph:

Claims 50-54 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. This rejection is traversed for at least the following reasons.

Applicant wishes to point out that claims 50-54 are original claims that were contained in the application *as filed*. Consequently, it is impossible for these claims to lack a written description in the original specification; the claims themselves provide the required support and written description in the original specification.

Nevertheless, to expedite the prosecution of this application, Applicant has amended paragraph 0038 of the specification to include the recitations and subject matter of claims 50-54. Original claims 50-54 provide the support for the amendment to paragraph 0038. Therefore, no new matter has been added.

In any event, the erroneous rejection of claims 50-54 under § 112, first paragraph, should be reconsidered and withdrawn.

Prior Art:

Claims 1-12, 13, 24, 31 and 55 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of U.S. Patent No. 6,329,738 to Hung et al. ("Hung") and

U.S. Patent No. 7,197,225 to Romo et al. ("Romo"). For at least the following reasons, this rejection is respectfully traversed.

Claim 1 recites:

> A diffractive light device (DLD) comprising:
> a substrate;
> a force plate disposed on said substrate, said force plate configured to produce an electrostatic force in response to an applied voltage;
> a pixel plate supported by a flexure adjacent to said force plate, wherein a position of said pixel plate is controlled by said electrostatic force and by said flexure coupled to said pixel plate to display a pixel of an image;
> a temperature sensor thermally coupled to said flexure, without affecting movement of said flexure, and outputting a thermal measurement indicative of a temperature of said flexure; and
> a circuit that generates and applies a temperature compensated voltage to said force plate in response to said thermal measurement produced by said temperature sensor.

Support for the amendments to claim 1 can be found in Applicant's originally-filed specification at, for example, paragraphs 0015, 0019, 0024 and 0025.

According to the Office Action, Hung teaches the claimed DLD comprising a pixel plate at Figs. 1b and 22. (Action of 4/23/07, pp. 3 and 6). This is clearly incorrect.

Hung does not teach or suggest that element 30 of Fig. 1b is a pixel plate or has any such optical or imaging function. Rather, Hung describes element 30 merely as a "deflection region 30 ... located between the actuation regions, central to the beam." (Hung, col. 8, lines 43-53).

The Office Action also cites Hung at Fig. 22. In Fig. 22, Hung teaches a programmable, optical diffraction grating comprising an array of mirrors at variable heights. (Hung, col. 26, lines 36-38). According to Hung,

> When light 192 from a broadband source is directed onto the array of mirrors, the heights of the mirrors control the optical path length of light reflected from the mirrors. Specifically, path of a light ray reflected from the grating depends on the

> height of that mirror from which the ray was reflected. This effect results in a phase shift between reflected light rays, and leads to the formation of a diffracted light beam 194. Collection of this diffracted light beam 194 at an angle, .theta., corresponding to the selected mirror heights, enables detection and analysis of wavelength-specific optical information. Thus, the diffraction grating 180 functions as an electrically-programmable optical filter, where the heights of the mirrors implement an optical diffraction transfer function. Accordingly, real time electrostatic analog positioning of the grating mirror heights enables adjustment and modulation of the optical transfer function of the grating.
>
> These capabilities of the diffraction grating of the invention are particularly well-suited for use in an electrostatically programmable polychromator system as contemplated by the invention. In general, in a polychromator system, for an array of diffraction grating mirrors of a given periodicity and of given mirror heights, a polychromatic light beam, or ***a plurality of light beams of differing wavelengths, can be dispersed over a range of wavelength-dependent diffraction angles by directing the polychromatic input light at the diffraction grating.*** This enables wavelength-specific demultiplexing of the dispersed reflected light for spectral analysis or other application. Similarly, the diffraction grating can be operated to enable multiplexing of input dispersed light to form polychromatic output light by appropriate selection of the mirror heights and periodicity.

(Hung, col. 26, line 55 to col. 27, line 19).

Thus, this grating reflects different wavelengths of light at different angles, much like a prism separates wavelengths of white light by angle.

More importantly, the grating taught by Hung is not a display device and does not include a "pixel plate" that is controlled "to display a pixel of an image." Despite the efforts of the Office Action to misread Hung, Hung has nothing to do with pixel plates or display devices.

Overlooking this fact, the Office Action does appear to concede that Hung fails to teach or suggest the claimed temperature sensor in connection with a pixel plate. (Action of 4/23/07, p. 6). Consequently, the Action cites to Romo. (*Id.*). Romo, however, also fails to teach a temperature sensor in connection with a pixel plate of a DLD.

Romo teaches two optical waveguides that are variably deflected into misalignment to obtain a desired degree of attenuation of an optical signal propagating between the two

waveguides. (Romo, abstract). Romo does not teach, suggest or even mention a pixel plate and has nothing to do with a DLD. Romo does mention "a temperature compensation coefficient that is used in determining the movable cantilever position [of a waveguide] necessary for a given optical attenuation." (Romo, col. 9, line 66-col. 10, line 4). However, neither Romo nor Hung teach or suggest the claimed temperature sensor in connection with a pixel plate of a DLD.

Moreover, neither Hung nor Romo teach or suggest "a temperature sensor thermally coupled to said [pixel plate] flexure, without affecting movement of said flexure, and outputting a thermal measurement indicative of a temperature of said flexure."

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966), the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue. In the present case, neither Hung nor Romo teach anything related to a pixel plate controlled to display a pixel of an image. Neither of these references discuss, teach or suggest the claimed temperature sensor in connection with a pixel plate of a DLD. This subject matter is outside the scope and content of the prior art as evidenced by Hung and Romo. Given this significant difference between the scope of the prior art and the claimed subject matter, Hung and Romo cannot support a rejection of claim 1 under the *Graham* analysis.

Moreover, claim 1 recites that the temperature sensor is "thermally coupled *to said flexure*, without affecting movement of said flexure, and outputting a thermal measurement indicative of a temperature *of said flexure*." (Emphasis added). This additional subject matter is not taught or suggested by, and is outside the scope of, the cited prior art.

For any and all of these reasons, the rejection of claim 1 and its dependent claims should be reconsidered and withdrawn.

Claim 12 recites:

A micro-electro mechanical system (MEMS) comprising:
a substrate;
a pixel plate coupled to said substrate;
a force plate disposed on said substrate adjacent to said pixel plate, wherein said force plate is configured to exert an electrostatic force on said pixel plate; and
a temperature sensor thermally coupled to said MEMS;
wherein said MEMS is configured to adjust said electrostatic force in response to a temperature measurement performed by said temperature sensor.

In contrast, as demonstrated above, the teachings of Hung and Romo do not include or provide for a temperature sensor in connection with a pixel plate, "wherein said MEMS is configured to adjust said electrostatic force [on said pixel plate] in response to a temperature measurement performed by said temperature sensor." For at least these reasons, the rejection of claim 12 and its dependent claims should be reconsidered and withdrawn.

Independent claim 24 recites:

An image display device comprising:
a system controller;
a variable voltage source communicatively coupled to said system controller; and
an array of DLDs communicatively coupled to said variable voltage source, each DLD of said DLD array including a substrate, a force plate disposed on said substrate, said force plate configured to produce an electrostatic force in response to a voltage applied by said voltage source, a pixel plate disposed adjacent to said force plate, wherein a position of said pixel plate is determined by said electrostatic force and a flexure coupled to said pixel plate, and a temperature sensor thermally coupled to said DLD so as to determine a temperature of said flexure, *wherein said image display device is configured to vary said electrostatic force in response to a temperature measurement performed by said temperature sensor.*

(Emphasis added).

Support for the amendments to claim 24 can be found in Applicant's originally filed specification at, for example, paragraph 0019 and 0025.

In contrast, as demonstrated above, the teachings of Hung and Romo do not include or provide for a temperature sensor in connection with a pixel plate, "wherein said image display device is configured to vary said electrostatic force [positioning the pixel plate] in response to a thermal measurement performed by said temperature sensor." Moreover, the teachings of Hung and Romo do not include or provide for a temperature sensor "thermally coupled to said DLD so as to determine a temperature of said flexure." For at least these reasons, the rejection of claim 24 and its dependent claims should be reconsidered and withdrawn.

Claims 2, 3, 5-9, 14-16, 18-22, 25-26, 28, 29, 32, 33, 35-38, 56 and 58-60 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Hung, Romo and U.S. Patent No. 5,088,806 to McCartney et al. ("McCartney"). This rejection is respectfully traversed for the reasons given above with respect to the patentability of the independent claims 1, 12, 24 and 31, and for the following additional reasons.

Claim 2 recites:

> an offset voltage generator, wherein said offset voltage generator is configured to generate a temperature compensated offset voltage based on said thermal measurement; and
>
> a summing element for adding said offset voltage to a reference voltage to produce said temperature compensated voltage.

Support for the amendment to claim 2 can be found in Applicant's originally filed specification at, for example, Fig. 3 and the associated text.

In contrast, the combination of cited prior art fails to teach or suggest this subject matter. The Office Action concedes that Hung and Romo fail to teach or suggest the claimed offset voltage generator. (Action of 4/23/07, p. 10). Consequently, the action cites to McCartney on this point. (*Id.*).

McCartney is directed to a liquid crystal display (LCD). According to McCartney, "it is necessary that the temperature of the liquid crystal material of the display be high enough for sufficient display response time." (McCartney, col. 4, lines 9-12). Accordingly, McCartney teaches a temperature sensor and "a digital signal that identifies the voltage needed, at the temperature determined by the temperature sensing element to obtain the correct optical transmission," i.e., the desire response time. (McCartney, col., 4, lines 24-33).

As will be well-known to those of skill in the art, an LCD operates on entirely different principles than does a DLD.

The Office Action fails to explain or even address why the teachings of McCartney relative to an LCD would have been applied by one of skill in the art to a DLD as recited in claim 2. For at least this additional reason, the rejection of claim 2 should be reconsidered and withdrawn.

Claim 3 recites "wherein said temperature compensated offset voltage is configured to compensate for a change in spring force exerted on said pixel plate by said flexure at a measured temperature." Claims 14, 25 and 33 recites similar subject matter.

As demonstrated above, to the extent that McCartney teaches an offset voltage generator, that offset voltage is created "to obtain the correct optical transmission" of the liquid crystal material based on temperature. (McCartney, col., 4, lines 24-33). This clearly has nothing to do with "a change in spring force exerted on said pixel plate by said flexure. Consequently, the cited collection of prior art does not include within its scope the claimed temperature compensated offset voltage "configured to compensate for a change in spring force exerted on said pixel plate by said flexure at a measured temperature." For at least this

additional reason, the rejection of claims 3, 14, 25 and 33 should be reconsidered and withdrawn.

Claim 8 recites:

> wherein said summing element comprises a summing circuit, wherein said summing circuit is configured to combine said temperature compensated offset voltage with each of a plurality of color specific voltages to produce a temperature compensated voltage corresponding to each of a plurality of colors produced by pixel elements of said DLD.

Claim 21 recites similar subject matter. Support for the amendments to claims 8 and 21 can be found in Applicant's originally filed specification at, for example, Fig. 3 and the associated text.

In contrast, the cited prior art utterly fails to teach or suggest the claimed summing circuit "configured to combine said temperature compensated offset voltage with each of a plurality of color specific voltages to produce a temperature compensated voltage corresponding to each of a plurality of colors produced by different pixel elements of said DLD." This subject matter is entirely outside the scope and content of the prior art. For at least this additional reason, the rejection of claims 8 and 21 should be reconsidered and withdrawn.

Claim 15 recites "an offset voltage generator, wherein said offset voltage generator is configured to vary said electrostatic force based on said temperature measurement." As demonstrated above, to the extent that McCartney teaches an offset voltage generator, that offset voltage is the voltage "to obtain the correct optical transmission" of the liquid crystal material based on temperature. (McCartney, col., 4, lines 24-33). This clearly has nothing to do with "vary[ing] said electrostatic force" of a MEMS force plate as recited in claim 15. For

at least this additional reason, the rejection of claim 15 should be reconsidered and withdrawn.

Claim 16 recites "wherein said temperature compensated offset voltage generator is configured to produce an offset voltage to compensate for said variation in spring force provided by said flexure." As demonstrated above, the cited prior art does not teach or suggest an offset voltage generator that "compensate[s] for said variation in spring force provided by said flexure." For at least this additional reason, the rejection of claim 16 should be reconsidered and withdrawn.

Claims 10, 11, 23, 30, 39 and 61-62 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Hung, Romo and U.S. Patent No. 5,903,251 to Mori et al. ("Mori"). This rejection is respectfully traversed for the reasons given above with respect to the patentability of the independent claims 1, 12, 24 and 31, and for the following additional reasons.

Claim 11 recites "wherein said temperature sensor is configured to measure an average temperature of flexures in an array of DLDs." Claim 30 recites similar subject matter. Support for the amendment to claims 11 and 30 can be found in Applicant's originally filed specification at, for example, paragraphs 0025 and 0027. This subject matter is not taught by, suggested by or within the scope of the prior art of record. For at least this additional reason, the rejection of claim 11 and 30 should be reconsidered and withdrawn.

Claims 4, 17, 27 and 34 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Hung, Romo and U.S. Patent No. 7,038,654 to Naiki et al.

("Naiki"). This rejection is respectfully traversed for the reasons given above with respect to the patentability of the independent claims 1, 12, 24 and 31, and for the following additional reasons.

Claim 4 recites:

> wherein said offset voltage generator comprises:
> a buffer amplifier;
> a low pass filter electrically coupled to said buffer amplifier; and
> a scaler/offset amplifier electrically coupled to said low pass filter.

The other claims, 17, 27 and 34, recite similar subject matter.

In this regard, the Office Action cites three elements in three different figures of Naiki. (Action of 4/23/07, p. 14). However, in reality, Naiki does not teach or suggest the claimed offset voltage generator. For example, Naiki does not teach a low pass filter as part of an offset voltage generator as claimed. In this regard, the Office Action refers to a digital averaging circuit 13, which clearly is not a low pass filter coupled between a buffer amplifier and a scaler/offset amplifier as claimed. (Action of 4/23/07, p. 14 citing Naiki at col. 11, lines 46-49). For at least this additional reason, the rejection of these claims should be reconsidered and withdrawn.

Claims 40, 42, 44-46 and 49-54 were rejected as being unpatentable under 35 U.S.C. § 103(a) over the combined teachings of McCartney and Hung. This rejection is respectfully traversed for at least the following reasons.

Claim 40 recites:

> A method of compensating for thermal effects in a DLD comprising:
> measuring a temperature of said DLD;
> generating a temperature compensated offset voltage associated with an effect said temperature will have on said DLD; and

producing a temperature compensated voltage on said DLD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said DLD compensates for said thermal effects.

With regard to claim 40, Applicant wishes to note that: "The materials on which a process is carried out must be accorded weight in determining the patentability of a process. *Ex parte Leonard*, 187 USPQ 122 (Bd. App. 1974)." (See MPEP § 2116).

As noted above, Hung does not teach or suggest any temperature sensor. (Action of 4/23/06, p. 6). Consequently, Hung clearly does not teach or suggest "measuring a temperature of [a] DLD." Similarly, McCartney is directed to a liquid crystal display and measures the temperature of the liquid crystal material. (McCartney, col. 4, lines 9-12). Thus, McCartney also does not teach or suggest "measuring a temperature of [a] DLD."

Consequently, the combination of Hung and McCartney cannot teach or suggest any of the subject matter of claim 40. Neither teaches "measuring a temperature of [a] DLD." Neither teaches "generating a temperature compensated offset voltage associated with an effect said temperature will have on said DLD." Neither teaches "producing a temperature compensated voltage on said DLD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said DLD compensates for said thermal effects."

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966), the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue. In the case of claim 40, all of the elements of the method of claim 40 appear to be beyond the scope of the prior art as evidenced by McCartney and Hung. The prior art does not provide for a method of compensating for thermal effects in a DLD as recited in claim 40. For at least these reasons, the rejection of claim 40 should be reconsidered and withdrawn.

Claim 50 recites:

> A processor readable medium having instructions thereon that are executable by a processor for:
> sensing a temperature change of a DLD; and
> modifying a voltage provided to said DLD in response to said sensed temperature change.

In contrast, as demonstrated above, the teachings of McCartney and Hung fail to teach or suggest any of this subject matter. Neither reference teaches or suggests executable instructions on a processor readable medium for "sensing a temperature change of a DLD" or for "modifying a voltage provided to said DLD in response to said sensed temperature change."

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966), the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue. In the case of claim 50, all of the subject matter of claim 50 appears to be beyond the scope of the prior art as evidenced by McCartney and Hung. The prior art does not provide for a processor instructions for sensing temperature change in a DLD and modifying a voltage provided to the DLD in response. For at least these reasons, the rejection of claim 50 should be reconsidered and withdrawn.

Claim 41 was rejected under 35 U.S.C. § 103(a) over the combined teachings of McCartney, Hung and Romo. This rejection is traversed for at least the same reasons given above with respect to the patentability of claim 40.

Claim 43 was rejected under 35 U.S.C. § 103(a) over the combined teachings of McCartney, Hung and Naiki. This rejection is traversed for at least the same reasons given above with respect to the patentability of claim 40.

Claims 47 and 48 were rejected under 35 U.S.C. § 103(a) over the combined teachings of McCartney, Hung and Mori. This rejection is traversed for at least the same reasons given above with respect to the patentability of claim 40.

Claim 57 was rejected under 35 U.S.C. § 103(a) over the combined teachings of Hung, Romo and Naiki. This rejection is rendered moot by the cancellation herein of claim 57.

Conclusion:

The newly added claim is thought to be patentable over the prior art of record for at least the same reasons given above with respect to the original independent claims. Support for the newly added claim is found in Applicant's original specification at, for example, paragraph 0026. Therefore, examination and allowance of the newly added claim is respectfully requested.

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

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